

1. A method of processing collagen-based tissue prior to implantation into a recipient in need thereof, said method comprising the steps of:

- decellurizing said collagen-based tissue such that substantially all cells, cellular debris, lipids and proteins are removed; and
- preserving the resulting collagen scaffold through a bioreactor, cryopreservation, freezing, chilling, drying, room temperature packaging, or freeze-drying.

2. The method of processing collagen-based tissue prior to implantation into a recipient in need thereof, according to claim 1, further comprising repopulating the collagen scaffold with cells having lower immunogenicity toward the recipient than the collagen-based tissue; and growing said cells on and within said collagen-based tissue in an organ perfusion system.

3. An acellular collagen-based tissue produced according to the method of claim 1.

4. The method according to claim 1, wherein said collagen-based tissue is selected from the group consisting of a heart, heart valve, joint, soft tissue organ and vasculature.

5. The method according to claim 1, wherein said collagen-based tissue consists of a total joint.

6. The method according to claim 1, wherein said collagen-based tissue consists of a trachea.

7. The method according to claim 1, wherein said collagen-based tissue consists of a knee, shoulder, wrist, ankle or elbow joint.

14. The method of claim 13, wherein said viral inactivating agent comprises about 0.5 percent or more, weight percent, benzalkonium chloride solution.

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22. The method of claim 21 wherein said decellularizing agent comprises a solution
40 comprising, by weight, about 1 percent tween 20 and about 0.5 percent hydrogen
peroxide; and wherein said method further optionally comprises sonicating said tissue
during step b.

23. The method of claim 21 wherein said tissue is dermis.

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24. A method for treating tissue effecting the decellularizing and inactivating viruses in said tissue comprising the steps of:

a) contacting said tissue with a solution comprising about 0.5 percent or more, by weight, benzalkonium chloride;

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b) contacting said tissue with a solution comprising about 0.5 percent or more, by weight, tween 20 and about 0.5 percent or more, by weight, hydrogen peroxide; and

c) contacting said tissue with a calcium hydroxide solution.

25. The method of claim 24, wherein said calcium hydroxide solution is saturated.

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26. The method of claim 24, further comprising contacting said tissue treated with said calcium hydroxide solution with a calcium chelating agent; optionally sonicating said tissue during contacting said tissue with said chelating agent.

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27. The method of claim 26, wherein said calcium chelating agent is a solution comprising about 0.5 percent to about 5 percent EDTA.

28. The method of claim 24, further comprising drying said tissue.

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29. The method of claim 28 wherein drying said tissue comprises contacting said tissue with an alcohol solution.

30. The method of claim 24, further comprising lyophilizing said tissue.

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31. The method of claim 24, further comprising cutting and packaging said tissue.

32. The method of claim 24, wherein said tissue is sonicated during steps b and c.

33. The method of claim 32 further comprising irradiating said tissue:

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34. A method for decellularizing and inactivating viruses in dermis tissue comprising the steps of:

- a) obtaining a sample of crude dermis tissue;
- b) treating said crude dermis tissue with sodium chloride;
- 80 c) separating epidermis from dermis of said crude dermis tissue by manual debridement to produce dermis sample;
- d) contacting said dermis sample with a solution comprising 0.5 percent or more, by weight, benzalkonium chloride;
- e) contacting said dermis sample with a solution comprising 0.5 percent or more, 85 by weight, tween 20 and 0.5 percent or more hydrogen peroxide; optionally further comprising simultaneous sonication of said dermis sample;
- f) contacting said dermis with a solution of saturated calcium hydroxide; and subsequent rinsing of said dermis sample followed by chelating of said dermis sample by contact with a chelating agent; and optionally further comprising sonicating said dermis 90 sample during contact with said saturated calcium hydroxide;
- g) neutralizing pH of said dermis sample with a neutralizing buffer, followed by rinsing said dermis sample
- h) drying said dermis sample with an alcohol solution comprising about 50 to about 100 percent, by weight, alcohol;
- 95 i) lyophilizing said dermis sample;
- j) cutting said dermis sample; and
- k) irradiating said dermis sample.

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